



GEOLOGIC CROSS SECTION 2L – SHIRLEY HIGHWAY

Cross section 2L follows the Shirley Highway corridor, spanning the west-central part of the map area from Edsall Road to Four Mile Run. The section illustrates the varied geology and complex bedrock surface topography in a part of the map area where the Potomac Formation and surficial sediments are sufficiently thin to expose the bedrock in and near several major stream valleys. Its central location also makes Shirley Highway a “keystone” section in the series, intersecting seven other cross sections and encompassing dozens of major geotechnical boring sites, historical water wells, a key fossil locality in the Potomac Formation, and sites of cultural, historical, and environmental interest. These features are indicated by labels and symbols on the cross section. The specific location of the cross section is indicated on Plate 1 by a deep yellow section line.

The cross sections are intended to be used together with the other maps, particularly Plate 5, to illustrate the third dimension of the map units and their relation to landforms and water resources. Contacts between map units are approximately located and may be gradational or transitional, especially in the Potomac Formation. The abundance of control points (surface exposures, wells, geotechnical sites) along the cross section provides a general indication of the reliability of contact locations. Map units are depicted using the same colors, patterns, and

labels as on Plate 5, and the explanation of map units on Plate 5 serves as the legend. The section also depicts some bedrock units, gravelly zones in the Winkler sand, and organic horizons that do not appear on Plate 5.

The dominant physiographic features are the several major stream valleys that trend perpendicular to the section and dissect the Dowden and Chinquapin Village terraces into a series of relatively level, remnant uplands flanked by steep-sided Quaternary ravines. Colluvium is abundant on these geomorphically active hillsides, locally forming thick fans along adjacent toeslopes and bottomlands, and dominating the soil profile in many places.

A significant number of tributary ravines originate(d) at springs on the divides occupied by Shirley Highway. Most of the springs are concentrated along the base of the Dowden terrace, particularly where the gravel overlies silty clays of the Potomac Formation, creating a sharp permeability contrast that causes ground water to flow laterally and emerge along concave hillsides where the contact crops out. Unlike the other upland terraces, the Dowden terrace is sufficiently thick and laterally extensive to support a thin, mostly perennial water table at many places. While springs do emerge from the other terraces, they tend to be less common and more seasonal in output, reflecting the

seasonally perched water table that develops in these thinner and less laterally extensive terraces. Many of the headwater streams in this highly urbanized corridor are now buried by artificial fill, however, and the locations of their source springs are obscured. One such stream is the so-called “Shirley Highway ravine” shown on the cross section; once a major tributary of Four Mile Run, virtually no evidence of the original stream remains today other than the broad swale occupied by Shirley Highway.

Several bedrock valleys visible in the cross section create locally complex bedrock topography and cause undulations in the altitude and thickness of the overlying Potomac Formation strata. The Cameron Valley sand is inferred to thicken considerably in the vicinities of these valleys, as they were the first places to be occupied by Early Cretaceous river channels at the onset of Potomac sedimentation. This relationship is locally demonstrated by thick sections of sand in outcrops, wells, and geotechnical borings in the talwegs of these valleys, such as the ones below Turkeycock and Four Mile Runs. Shirley Highway also marks the axis of the Winkler sand, which is deeply entrenched into the Lincolnia silty clay and attains its greatest thicknesses in this corridor. The section shows the overall east- to northeastward-descending base of the Winkler channel, indicating that it was likely deposited by a river flowing in the same direction.

EXPLANATION OF CROSS SECTION SYMBOLS:

- WATER WELL**
- WELL ID NUMBER AND SURFACE ELEVATION (SOURCE: J-JOHNSTON; D-DARTON; F-FROELICH)
 - WELL CASING
 - WATER LEVEL
 - WELL SCREEN
 - BEDROCK SURFACE
 - REPORTED BEDROCK LITHOLOGY
 - BOREHOLE IN BEDROCK
 - BOTTOM ELEVATION

- GEOTECHNICAL BORING SITES**
- ID NUMBER AND HIGHEST SURFACE ELEVATION
 - APPROXIMATE LATERAL AND VERTICAL EXTENT OF SITE ALONG CROSS SECTION LINE
 - WATER LEVEL
 - BOTTOM ELEVATION OF DEEPEST BORING

WATER LEVELS REPORTED IN WELLS AND GEOTECHNICAL BORINGS

- WATER LEVEL MEASURED IN WELL OR CASIED GEOTECHNICAL BORING COMPLETED IN THE CAMERON VALLEY SAND (LOWER AQUIFER OF THE POTOMAC FORMATION)
- WATER LEVEL MEASURED IN 1976 FROM WELL COMPLETED IN CAMERON VALLEY SAND (JOHNSTON AND LARSON, 1977)
- WATER LEVEL MEASURED IN WELL OR GEOTECHNICAL BORING COMPLETED IN OTHER AQUIFERS. MAY REPRESENT A COMPOSITE OR AVERAGE WATER LEVEL AT GEOTECHNICAL SITES WITH MANY BORINGS

OTHER SYMBOLS

- SURFACE EXPOSURE. SOME EXCAVATIONS COINCIDE WITH GEOTECHNICAL BORING SITES
- GRAVELLY ZONES IN THE WINKLER SAND (Kpw) REPORTED IN GEOTECHNICAL BORINGS
- ORGANIC ZONES REPORTED IN GEOTECHNICAL BORINGS FROM THE POTOMAC FORMATION, QUATERNARY ALLUVIUM, AND OTHER SEDIMENTS. INCLUDES WOOD, PEAT, LIGNITE, LEAVES, DARK ORGANIC SILT, AND OTHER ORGANIC MATERIAL
- SIGNIFICANT FOSSIL-BEARING HORIZON DESCRIBED BY HUEBER (1982). THE ACTUAL SITE LIES ABOUT 1,000 FT WEST OF THE CROSS SECTION LINE
- INTERSECTION WITH ANOTHER CROSS SECTION. CROSS SECTIONS ARE DISTINGUISHED BY NAME AND COLOR-CODED SECTION LINES AND TITLES